

1  
As used herein, "a method of treating a hydrocarbon containing formation" may be used interchangeably with "an in situ conversion process for hydrocarbons." "Hydrocarbons" are generally defined as molecules formed primarily by carbon and hydrogen atoms. Hydrocarbons may also include other elements, such as, but not limited to, halogens, metallic elements, nitrogen, oxygen, and/or sulfur. Hydrocarbons may be, but are not limited to, kerogen, bitumen, pyrobitumen, and oils. Hydrocarbons may be located within or adjacent to mineral matrices within the earth. Matrices may include, but are not limited to, sedimentary rock, sands, silicilytes, carbonates, diatomites, and other porous media.

On page 64, please delete the paragraph beginning on line 11, and substitute therefor:

2  
As shown in FIG. 3, in addition to heat sources 100, one or more production wells 104 will typically be disposed within the portion of the hydrocarbon containing formation. Formation fluids may be produced through production well 104. Production well 104 may also include a heat source. In this manner, the formation fluids may be maintained at a selected temperature throughout production, thereby allowing more or all of the formation fluids to be produced as vapors. Therefore high temperature pumping of liquids from the production well may be reduced or substantially eliminated, which in turn decreases production costs. Providing heating at or through the production well tends to: (1) inhibit condensation and/or refluxing of production fluid when such production fluid is moving in the production well proximate to the overburden, (2) increase heat input into the formation, and/or (3) increase formation permeability at or proximate the production well.

**In the Claims:**

Please cancel claims 4928-4955 without prejudice.

Listed below is a clean copy of amended and new claims. Marked-up copies of the amended claims are provided in an accompanying document.

C3 DI  
4904. (amended) A method of sequestering carbon dioxide within a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to a portion of the formation to increase a permeability of the portion such that the permeability is substantially uniform;

allowing the portion to cool; and

storing carbon dioxide in the portion. 4906. (amended) The method of claim 4904, further comprising raising a water level in the portion to inhibit migration of the carbon dioxide from the portion.

Sub EI  
4907. (amended) The method of claim 4904, further comprising heating the portion to release at least a portion of the stored carbon dioxide, and removing the released carbon dioxide from the portion.

4908. (amended) The method of claim 4904, further comprising pyrolyzing at least some hydrocarbons in the portion during the providing of heat to the portion, and removing pyrolyzation product from the formation.

C4  
4909. (amended) The method of claim 4904, further comprising producing synthesis gas from the portion during providing of heat to the portion, and removing synthesis gas from the formation.

4910. (amended) The method of claim 4904, wherein providing heat from one or more heaters to the portion comprises:

providing heat from one or more of the heaters to hydrocarbon containing material adjacent to one or more wellbores to increase a temperature of the hydrocarbon containing material to a temperature sufficient to support oxidation of the hydrocarbon containing material with an oxidizing fluid;

introducing the oxidizing fluid to the hydrocarbon containing material adjacent to the one or more wellbores to oxidize the hydrocarbons and produce heat; and

allowing the produced heat to transfer to the portion.

Sub E1  
D3  
4  
4911. (amended) The method of claim 4910, wherein at least one of the one or more heaters comprises an electrical heater. 4913. The method of claim 4904, wherein providing heat from one or more of the heaters to the portion comprises circulating heat transfer fluid through one or more heating wells in the formation.

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Sub E1  
4916. (amended) The method of claim 4904, further comprising removing fluid from the formation during the providing of heat to the portion, and combusting a portion of the removed fluid to generate heat to heat the formation.

C5  
4917. The method of claim 4904, wherein at least a portion of the stored carbon dioxide comprises excess carbon dioxide from a hydrocarbon bed demethanation process prior to storing the carbon dioxide in the portion.

Sub D5  
4918. (amended) The method of claim 4904, wherein at least a portion of the stored carbon dioxide was used for enhanced oil recovery prior to storing the carbon dioxide within the portion. 4923. The method of claim 4904, wherein storing carbon dioxide in the portion comprises adsorbing carbon dioxide onto hydrocarbon containing material within the formation.

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Sub E1  
4925. The method of claim 4904, wherein an amount of carbon dioxide stored in the portion is equal to or greater than an amount of carbon dioxide generated in the portion and removed from the formation during the providing of heat to the portion.

C6  
4926. (amended) The method of claim 4904, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern.

4927. (amended) The method of claim 4904, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, wherein the unit of heaters comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a

repetitive pattern of units.

5396. (new) A method of sequestering a fluid in a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to a portion of the formation to increase a permeability of the portion such that the permeability is substantially uniform;

allowing the portion to cool; and

storing a fluid in the portion.

5397. (new) The method of claim 5396, wherein the permeability of the portion is increased to over 100 millidarcy.

5398. (new) The method of claim 5396, further comprising heating the portion to release at least a portion of the stored carbon dioxide, and removing the released carbon dioxide from the portion.

5399. (new) The method of claim 5396, further comprising pyrolyzing at least some hydrocarbons in the portion during the providing of heat to the portion, and removing pyrolyzation product from the formation.

5400. (new) The method of claim 5396, further comprising producing synthesis gas from the portion during providing of heat to the portion, and removing synthesis gas from the formation.

5401. (new) The method of claim 5396, wherein providing heat from one or more heaters to the portion comprises:

providing heat from one or more of the heaters to hydrocarbon containing material adjacent to one or more wellbores to increase a temperature of the hydrocarbon material to a temperature sufficient to support oxidation of the hydrocarbon containing material with an oxidizing fluid;

introducing the oxidizing fluid to the hydrocarbon containing material adjacent to the one

Sub  
E1  
or more wellbores to oxidize the hydrocarbons and produce heat; and  
allowing the produced heat to transfer to the portion.

5402. (new) The method of claim 5396, wherein providing heat from one or more of the heaters to the portion comprises circulating heat transfer fluid through one or more heating wells within the formation.

5403. (new) The method of claim 5396, wherein the heat transfer fluid comprises steam.

5404. (new) The method of claim 5396, further comprising removing fluid from the formation during heating of the formation, and combusting a portion of the removed fluid to generate heat to heat the formation.

5405. (new) The method of claim 5396, wherein at least a portion of the stored carbon dioxide was used for enhanced oil recovery prior to storing the carbon dioxide within the portion.

5406. (new) The method of claim 5396, further comprising allowing the portion to cool by introducing water to the portion; removing the water from the formation as steam; and using the steam as a heat transfer fluid to heat a second portion of the formation.

5407. (new) The method of claim 5396, wherein storing carbon dioxide in the portion comprises adsorbing carbon dioxide onto hydrocarbon containing material within the formation.

5408. (new) The method of claim 5396, wherein an amount of carbon dioxide stored in the portion is equal to or greater than an amount of carbon dioxide generated in the portion and removed from the formation during the providing of heat to the portion.

5409. (new) The method of claim 5396, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern.

Sub  
E1  
5410. (new) A method of sequestering carbon dioxide in a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to a portion of the formation to increase a permeability of the portion such that the permeability is substantially uniform;  
allowing the portion to cool to about 100 °C or less; and  
storing carbon dioxide in the portion.

5411. (new) The method of claim 5410, wherein the permeability of the portion is increased to over 100 millidarcy.

5412. (new) The method of claim 5410, further comprising heating the portion to release at least a portion of the stored carbon dioxide, and removing the released carbon dioxide from the portion.

5413. (new) The method of claim 5410, further comprising pyrolyzing at least some hydrocarbons in the portion during the providing of heat to the portion, and removing pyrolyzation product from the formation.

5414. (new) The method of claim 5410, further comprising producing synthesis gas from the portion during providing of heat to the portion, and removing synthesis gas from the formation.

5415. (new) The method of claim 5410, wherein providing heat from one or more heaters to the portion comprises:

providing heat from one or more of the heaters to hydrocarbon containing material adjacent to one or more wellbores to increase a temperature of the hydrocarbon material to a temperature sufficient to support oxidation of the hydrocarbon containing material with an oxidizing fluid;

introducing the oxidizing fluid to the hydrocarbon containing material adjacent to the one or more wellbores to oxidize the hydrocarbons and produce heat; and

Sub  
E1

allowing the produced heat to transfer to the portion.

5416. (new) The method of claim 5410, wherein providing heat from one or more of the heaters to the portion comprises circulating heat transfer fluid through one or more heating wells within the formation.

5417. (new) The method of claim 5410, wherein the heat transfer fluid comprises steam.

5418. (new) The method of claim 5410, further comprising removing fluid from the formation during heating of the formation, and combusting a portion of the removed fluid to generate heat to heat the formation.

5419. (new) The method of claim 5410, wherein at least a portion of the stored carbon dioxide was used for enhanced oil recovery prior to storing the carbon dioxide within the portion.

5420. (new) The method of claim 5410, further comprising allowing the portion to cool by introducing water to the portion; removing the water from the formation as steam; and using the steam as a heat transfer fluid to heat a second portion of the formation.

5421. (new) The method of claim 5410, wherein storing carbon dioxide in the portion comprises adsorbing carbon dioxide onto hydrocarbon containing material within the formation.

5422. (new) The method of claim 5410, wherein an amount of carbon dioxide stored in the portion is equal to or greater than an amount of carbon dioxide generated in the portion and removed from the formation during the providing of heat to the portion.

5423. (new) The method of claim 5410, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern.

**Response To Office Action Mailed September 24, 2002**

**A. Pending Claims**

Claims 4904-4927 and 5396-5423 are currently pending. Claims 4904, 4906-4911, 4913, 4916-4918, 4923, and 4925-4927 have been amended. Claims 4928-4955 have been cancelled without prejudice. Claims 5396-5423 are new.

**B. Submission of Corrected Formal Drawings**

In the Office Action mailed September 24, 2002, the Examiner indicated approval of the proposed drawing corrections filed on March 1, 2002. Applicant submits the corrected formal drawings approved by the Examiner (nine sheets, including FIGS. 23a, 23b, 32, 56, 57, 67, 68, 72, 73, 76, 81a, and 97).

**C. Election/Restriction**

The Examiner requires a restriction between Group I claims and Group II claims. In a telephone conference with Eric Meyertons on September 20, 2002, a provisional election was made with traverse to prosecute the invention of Group I drawn to a method of sequestering carbon dioxide (claims 4904-4927). Applicant affirms the election of the Group I claims. Applicant believes that all pending claims, including the new claims, are directed to the elected invention.

**D. Provisional Double Patenting Rejection**

The Examiner provisionally rejected claims 4904-4927 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of copending U.S. Patent Application Nos.:



09/840,936; 09/840,937; 09/841,000; 09/841,060, 09/841,061; 09/841,127;  
09/841,128; 09/841,129; 09/841,130; 09/841,131; 09/841,170; 09/841,193;  
09/841,194; 09/841,195; 09/841,238; 09/841,239; 09/841,240; 09/841,283;  
09/841,284; 09/841,285; 09/841,286; 09/841,287; 09/841,288; 09/841,289;  
09/841,290; 09/841,291; 09/841,292; 09/841,293; 09/841,294; 09/841,295;  
09/841,296; 09/841,297; 09/841,298; 09/841,299; 09/841,300; 09/841,301;  
09/841,302; 09/841,303; 09/841,304; 09/841,305; 09/841,306; 09/841,307;  
09/841,308; 09/841,309; 09/841,310; 09/841,311; 09/841,312; 09/841,429;  
09/841,430; 09/841,431; 09/841,432; 09/841,433; 09/841,434; 09/841,435;  
09/841,436; 09/841,437; 09/841,438; 09/841,439; 09/841,440; 09/841,441;  
09/841,442; 09/841,443; 09/841,444; 09/841,445; 09/841,446; 09/841,447;  
09/841,448; 09/841,449; 09/841,488; 09/841,489; 09/841,490; 09/841,491;  
09/841,493; 09/841,494; 09/841,495; 09/841,496; 09/841,497; 09/841,498;  
09/841,499; 09/841,500; 09/841,501; 09/841,502; 09/841,632; 09/841,633;  
09/841,634; 09/841,635; 09/841,636; 09/841,637; 09/841,638; and 09/841,639.

Applicant respectfully traverses the provisional double patenting rejection. Applicant respectfully submits that the omnibus nature of this rejection does not provide Applicant with sufficient detail in which to address such rejection. Applicant also respectfully submits that the rejection is also inconsistent with certain restrictions issued in the above-referenced cases. Applicant respectfully requests reconsideration.

Pursuant to a discussion in an Examiner interview on August 19, 2002, for the convenience of the Examiner, Applicant will forward copies of allowed claims for the above-referenced cases to the Examiner. Applicant understands that the Examiner will review the allowed claims for the above-referenced cases and then reconsider the double patenting rejection in view of such allowed claims.

**E. The Claims Are Definite Pursuant To 35 U.S.C. § 112, Second Paragraph**

The Examiner rejected claims 4907, 4917, and 4918 under 35 U.S.C. § 112, second paragraph, “as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.” Applicant respectfully disagrees with these rejections.

The Examiner states: "Claim 4907 is unclear whether the carbon dioxide is the carbon dioxide that has been stored, or carbon dioxide present in the formation before sequestering." Applicant has amended claim 4907 for clarity.

The Examiner states: "Claim 4917 is unclear regarding the using the carbon dioxide prior to storing the carbon dioxide. Since the step of using the carbon dioxide inherently stores the carbon dioxide, it is unclear how it can be "before." Applicant has amended claim 4917 for clarity.

The Examiner states: "Claim 4918 is unclear regarding the using the carbon dioxide prior to storing the carbon dioxide. Since the step of using the carbon dioxide inherently stores the carbon dioxide, it is unclear how it can be "before." Applicant has amended claim 4918 for clarity.

**F. The Claims Are Not Obvious Over Terry In View Of Chaback Pursuant To 35 U.S.C. § 103(a)**

The Examiner rejected claims 4904-4926 as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,089,374 to Terry (hereinafter "Terry") in view of U.S. Patent No. 5,454,666 to Chaback et al. (hereinafter "Chaback"). Applicant respectfully disagrees with these rejections.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974), MPEP § 2143.03.

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Amended claim 4904 describes a combination of features including: "providing heat from one or more heaters to a portion of the formation to increase a permeability of the portion

such that the permeability is substantially uniform....” Applicant submits that these features, in combination with the other features of the claim, do not appear to be taught or suggested by the combination of Terry and Chaback.

The Examiner states:

The Terry reference teaches a method of producing methane from a coal seam including heating to increase permeability and allowing the formation to cool. The Terry reference teaches that the disclosed method results in increased methane production.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Chabak method to have the methane produced by heating to increase permeability and cooling the formation as taught by Terry, and as called for in claim 4904, in order to increase methane production.

Applicant respectfully disagrees with the rejection of claim 4904.

Terry discloses:

The next phase of the production cycle is begun by igniting the lower portion of coal bed 16 using procedures common in the in situ gasification of coal. Combustion is sustained by injection of an oxidizer, for example air, through flow line 21 into annulus 31 and into the well bore near the ignition point....

In situ combustion of the coal continues until an underground [*sic*] chamber, sometimes called a collection chimney, of sufficient size has exposed an area of coal of the desired magnitude in coal seam 16....

For the second phase of the in situ burn, tubing 20 is raised so that its lowermost part is near the bottom of coal seam 14. The exposed face of coal seam 14 has been absorbing heat from the hot flue gases and normally will have an exposed face temperature above the ignition temperature of the coal. Resumption of oxidizer injection through annulus 31 will begin the process of burning an underground chamber in coal seam 14. A collection chimney is then burned in coal seam 14 using methods as described for coal seam 16 above, until the chimney reaches a maximum practical size as illustrated by 29 on the drawing.

(Terry, column 5, lines 18-58)

In the Specification, a heater is described as: “any system configured to generate heat in a well or a near wellbore region.” (Specification, page 40, lines 6-7) Terry appears to teach heating a coal seam by in situ combustion of the coal. Terry does not appear to teach heating a formation with a heater as recited in claim 4904.

Applicant submits that the heating taught by Terry will not increase the permeability of the portion of the formation such that the permeability is substantially uniform. Applicant’s Specification describes heating a portion of a formation to increase the permeability of a portion of the formation such that the permeability is substantially uniform on at least page 152.

Terry does not appear to teach or suggest providing heat from one or more heaters to a portion of the formation to increase a permeability of the portion such that the permeability is substantially uniform. At least the above-mentioned features in amended claim 4904, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4904 and the claims dependent thereon.

The Examiner states: “With regards to claim 4905, the Terry reference does not explicitly disclose the 100 millidarcy; however this is inherent with a shrinking coal as taught by Terry.”

Applicant disagrees that the teachings and suggestions of Terry would inherently encompass an increase in permeability as recited in claim 4905. Claim 4905 includes the feature: “wherein the permeability of the portion is increased to over 100 millidarcy.” Terry does not appear to teach or suggest at least the above-mentioned features, in combination with the other features of the claim. Applicant respectfully submits that the Examiner’s rejection of claim 4905 may rely upon personal knowledge of the Examiner and therefore Applicant believes MPEP 2144.03 will apply. Applicant respectfully requests the Examiner to provide support for his assertion either by an affidavit or by references brought to the Applicant’s attention. Otherwise, Applicant requests this rejection be removed.

The Examiner states: "With regards to claim 4907, the Terry reference teaches the heating to release carbon dioxide (this is inherent when burning coal with an oxidizer see col. 2, last paragraph), thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have heated the formation to release carbon dioxide, in order to increase methane production."

Terry states: "Coal is burned in situ from the bottom of the seam upward until an underground chamber or collection chimney is formed. The products of combustion, being a low BTU fuel gas, are captured at the surface." (Terry, column 2, line 67 to column 3, line 2)

Terry appears to teach heating a formation with in situ combustion and removing the products of combustion from the formation. Terry does not appear to teach heating to release stored carbon dioxide. Amended claim 4907 recites in part: "heating the portion to release at least a portion of the stored carbon dioxide, and removing the released carbon dioxide from the portion." At least the above-quoted features of claim 4907, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4907.

The Examiner states: "With regards to claim 4910, the Terry reference teaches heating and introducing oxidizing fluid, thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have included heating and introducing oxidizing fluid, in order to increase methane production." Applicant respectfully disagrees with this rejection.

Amended claim 4910 describes a combination of features including: "providing heat from one or more of the heaters to hydrocarbon containing material adjacent to one or more wellbores to increase a temperature of the hydrocarbon containing material to a temperature sufficient to support oxidation of the hydrocarbon containing material with an oxidizing fluid." As discussed in this section, the cited art does not appear to teach or suggest the use of a heater (e.g., a natural distributed combustor). A natural distributed combustor is described on at least

pages 12-13 of the Specification. The combination of Terry and Chaback does not appear to teach or suggest at least the above-mentioned features in amended claim 4910, in combination with the other features of the claim. Applicant respectfully requests removal of the rejection of claim 4910.

The Examiner states: "Regarding claim 4911; applicant has not disclosed that electrical heating provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well without heating because the nature of the heating mechanism does not impart any special qualities on the heat produced. Therefore, it would have been obvious to one of ordinary skill in the art to further modify the Chaback to obtain the invention as specified in claim 4911."

Amended claim 4911 describes a combination of features including: "wherein at least one of the one or more heaters comprises an electrical heater." As discussed in this section, the cited art does not teach the use of a heater. The Specification cites several advantages of using heaters, such as electrical heaters, to heat a formation. For example, heaters may allow substantially uniform heating of a portion of a formation, as disclosed on at least page 14 of the Specification. Advantages of using electrical heaters to heat a portion of a formation are described on at least page 14 of the Specification. At least the above-mentioned features of claim 4911, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4911.

Amended claim 4913 describes a combination of features including: "wherein providing heat from one or more of the heaters to the portion comprises circulating heat transfer fluid through one or more heating wells in the formation." For at least the reasons discussed in this section, the combination of Terry and Chaback does not appear to teach or suggest at least the above-mentioned features in amended claim 4913. Applicant respectfully requests removal of the rejection of claim 4913.

The Examiner states: "With regards to claim 4915, the Terry reference teaches steam,

thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have included steam, in order to increase methane production.”

Terry states:

During the in situ burn phases described above water accumulating in sump 18 is continuously removed from the well bore. Temperatures in the burn area may reach 2000° F or higher, and thus may cause damage to tubing 20 and in some cases to pipe 19. A cooling effect in the burn area may be attained by aligning the slots in the liner contained within pipe 19 with the perforations 24 in pipe 19. Such alignment will permit a portion of the upward water flow within pipe 19 to be diverted into annulus 31. ... Due to heat transfer through tubing 20, particularly adjacent to the burn area, the water will be substantially all steam when it exits into the well bore from the lower end of tubing 20. ... The water thus diverted into annulus 31 serves two purposes, first in cooling the metal parts underground, second in entering into the in situ combustion reaction in the region of the burning [*sic*] coal (sometimes called the reaction zone).

(Terry, column 5, line 59 to column 6, line 14.)

Terry appears to teach cooling the formation with water, which is converted to steam by heat transferred to the water from the formation. Terry does not appear to teach or suggest heating the formation with a heat transfer fluid. Thus, Terry does not appear to teach or suggest the features: “providing heat from one or more of the heaters to the portion comprises circulating heat transfer fluid through one or more heating wells in the formation” and “wherein the heat transfer fluid comprises steam.” At least the above-quoted features of claim 4915, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art.

The Examiner states: “With regards to claim 4916, the Terry reference teaches removing fluid and combusting, thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have included removing fluid and combusting, in order to increase methane production.” Applicant respectfully disagrees with this rejection.

Amended claim 4916 describes a combination of features including: “removing fluid from the formation during the providing of heat to the portion, and combusting a portion of the removed fluid to generate heat to heat the formation.” At least the above-quoted features of claim 4916, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4916.

The Examiner states: “With regards to claim 4919; Applicant has not disclosed that the source for the carbon dioxide provides an advantage, is used for a particular purpose, or solves a stated problem.... Therefore, it would have been obvious to one of ordinary skill in the art to further modify the Chaback method to obtain the invention as specified in claim 4919.” Applicant respectfully disagrees with this rejection.

Claim 4919 describes a combination of features including: “wherein at least a portion of the carbon dioxide comprises carbon dioxide generated in a fuel cell.” The Specification discloses that fluids generated from heating a formation may be used to generate electricity in a fuel cell, which generates carbon dioxide:

Certain embodiments may include separating a fuel cell feed stream from fluids produced from pyrolysis of at least some of the hydrocarbons within a formation. The fuel cell feed stream may include H<sub>2</sub>, hydrocarbons, and/or carbon monoxide. In addition, certain embodiments may include directing the fuel cell feed stream to a fuel cell to produce electricity. The electricity generated from the synthesis gas or the pyrolyzation fluids in the fuel cell may be configured to power electrical heaters, which may be configured to heat at least a portion of the formation. Certain embodiments may include separating carbon dioxide from a fluid exiting the fuel cell. Carbon dioxide produced from a fuel cell or a formation may be used for a variety of purposes. (Specification, page 26, lines 13-21)

At least the above-quoted features of claim 4919, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4919.



The Examiner states: "With regards to claim 4922, the Terry reference teaches using steam as heat transfer fluid, thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have included using steam as heat transfer fluid, in order to increase methane production." Applicant respectfully disagrees with the rejection.

As noted above, Terry teaches cooling the formation with water, which is converted to steam by heat transferred to the water from the formation. Thus, Terry does not appear to teach at least the features recited in claim 4922 including: "using the steam as a heat transfer fluid to heat a second portion of the formation." At least the above-quoted features of claim 4922, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4922.

The Examiner states: "Regarding claim 4925, Chaback teaches approximately 789 SCF per ton adsorbed (col. 8, line 12), which would be considerably more than generated by heating." Applicant respectfully disagrees with this rejection.

Amended claim 4925 describes combinations of features including: "wherein an amount of carbon dioxide stored in the portion is equal to or greater than an amount of carbon dioxide generated in the portion and removed from the formation during the providing of heat to the portion." At least the above-quoted features of claim 4925, in combination with the other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully submits that the Examiner's rejection of claim 4925 may rely upon personal knowledge of the Examiner and therefore Applicant believes MPEP 2144.03 will apply. Applicant respectfully requests the Examiner to provide support for his assertion either by an affidavit or by references brought to the Applicant's attention. Otherwise, Applicant requests this rejection be removed.

**G. The New Claims Are Not Anticipated or Obvious in view of the Cited Art**

Claim 5396 describes a combination of features including: “providing heat from one or more heaters to a portion of the formation to increase a permeability of the portion such that the permeability is substantially uniform; allowing the portion to cool; and storing a fluid in the portion.” Applicant submits that the cited art does not appear to teach or suggest all of the features in claim 5396 and the claims dependent thereon.

Claim 5410 describes a combination of features including: “allowing the portion to cool to about 100 °C or less; and storing carbon dioxide in the portion.” Applicant submits that the cited art does not appear to teach or suggest all of the features in claim 5410 and the claims dependent thereon.

#### **H. Prior Art Made of Record**

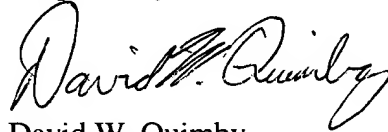
In the Office Action, the Examiner states: “The prior art made of record and not relied upon is considered pertinent to applicant’s disclosure. Cohn, et al. (U.S. Patent number 5,491,969); Gunter, et al. (U.S. Patent number 6,412,559); and Viteri, et al. (U.S. Patent number 6,389,814) teach CO<sub>2</sub> sequestration. Chaback, et al. (U.S. patent number 5,566,756); Mones (U.S. Patent number 6,244,338); Puri, et al. (U.S. Patent number 5,014,788); and Wilson (U.S. Patent number 5,402,847) teach methane production from a coal seam with increased permeability.” The cited art does not appear to teach or suggest the combination of features of the pending claims.

**I. Conclusion**

Applicant submits that all claims are in condition for allowance. Favorable reconsideration is respectfully requested.

Applicant believes that no fees are due with the filing of this document. If an extension of time is required, Applicant hereby requests the appropriate extension of time. If any fees are required, please appropriately charge those fees to Conley, Rose & Tayon, P.C. Deposit Account Number 50-1505/5659-08000/EBM.

Respectfully submitted,



David W. Quimby  
Reg. No. 39,338

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Date: Dec 24, 2002